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# Land Judging in South Dakota

Cooperative Extension South Dakota State University

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FS 563
Revised

# Land Judging in South Dakota

COOPERATIVE EXTENSION SERVICE
SOUTH DAKOTA STATE UNIVERSITY
U.S. DEPARTMENT OF AGRICULTURE

FS 563
(rev)

# Land Judging
## in South Dakota

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Land judging consists of measuring soil properties in the field, interpreting them, and then making intelligent land management decisions based on the measured and interpreted properties.

The ultimate objective in land judging is land classification. Once land is classified, you can make intelligent decisions concerning its use and management.

Land can be examined much as livestock or crops are examined. Look at size, shape, and color; then feel texture, finish, and firmness. When judging a soil we feel its texture; evaluate depth, slope, and stoniness; calculate past erosion; and interpret the soil's permeability and surface runoff.

Land is judged in the field by inspecting a vertical cross-section of soil (profile) in its natural state. Soils are three-dimensional bodies containing layers of various materials called horizons.

Through practice and field work such as in land appreciation schools, you can learn to observe, measure, and feel the soil properties, interpret these factors, classify a soil, and determine proper soil management.

### Land Judging Contest Procedures

Usually four fields numbered 1-4 are used in each contest. One or more pits are dug in each field, depending on the number of participants expected. The pit(s) should expose a soil profile to approximately a 4-foot depth (if possible). Representative samples of topsoil and subsoil are placed in boxes near each pit. The soil in the labeled boxes is used for texture determination and an estimation of soil permeability. Water for wetting these soils will be available near the boxes.

Approximately a one-foot-wide segment of the undisturbed soil profile should be flagged or otherwise marked. This is the area where present topsoil depth and total soil depth favorable for plant roots is determined. **No participant may touch or alter this segment** of the pit face. The depth of this soil profile should either be marked or a yardstick made available at each site.

Upon arrival, each participant will be informed of nutrient deficiencies, the availability of livestock manure, the original topsoil depth, and other pertinent information relative to the field. (See score card, field conditions section, Fig 2)

The official placing for each field is done before the contest by soil scientists. Their decisions are recorded and given to the tabulation committee as the official placings.

Participants are given a score card for each field to be judged. Name or contestant number, field number, and other information given by the contest leader should be filled in by the participant.

Participants are given 15 minutes to judge each field. Additional time is allowed for movement from field to field.

Contest areas do not have to be square, but should contain a minimum of 1000 square feet. Flags will be set to indicate the boundaries. Two well marked stakes of equal height will be set for use in estimating slope. The slope stakes will normally be set 100 feet apart but may be set at 50 feet if slope variability makes it necessary. If the slope stakes are set at 50 feet, requiring the participants to double the observed drop, they will be so informed by the contest officials and it will be listed under "other conditions."

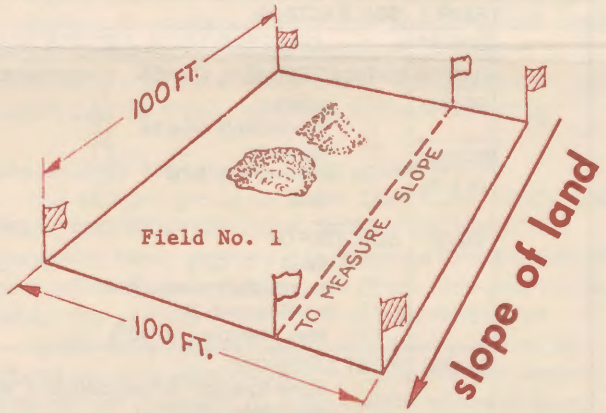



**Fig 1. Typical contest field.**

### Use of the Score Card

While filling out the score card (see Fig 2) the participant will evaluate the five following soil properties: texture (both surface and subsurface), depth, past erosion, slope, and stoniness. The participants will estimate permeability and surface runoff, list the limiting properties, and determine the land capability class. Then they choose proper land management practices. **Remember, in land judging always choose the most intensive use for the land capability class selected.**

Any soil property that eliminates a field from land capability Class I is a limiting property. Limiting properties are factors which either reduce the intensity with which a field may be used or are factors which require special land treatments to protect the field.

Climate is a factor which also may limit the land capability class of a field. Refer to Figure 3 to determine the effect of climate in your area.

### Scoring the Land Judging Card

Participants will turn in their completed score cards before going to the next field. The contest officials will grade and tabulate the score cards. Each field will have 40 points in Part 1 and 30 points in Part 2. Point values for each property and treatment are shown on the score card.

Note to contest officials: the contest officials may detemine how to weigh individual responses, including optional or alternative responses. The optional or alternative response should be of equal or lower value to the one selected by the soil scientists.

## Soil Texture

Soil texture refers to the proportions of sand, silt, and clay present in a soil sample. Soil texture in combination with soil structure affects moisture holding capacity, permeability, capacity to hold and furnish nutrients, tilth-tillage ease, load bearing

**LAND JUDGING SCORE CARD**

CONTESTANT NO. _____ FIELD NO. _____

NAME _____

ADDRESS _____

COUNTY/SCHOOL _____

**SOUTH DAKOTA STATE UNIVERSITY**
**COOPERATIVE EXTENSION SERVICE**
ES 374

FIELD CONDITIONS

Assume soil test deficiencies in:
Nitrogen (yes no) Potassium (yes no)
Phosphorus (yes no)

Livestock manure available: (yes no)

Original topsoil thickness was _____ inches

Pay no attention to practices on the field

Consider the most intensive use of the land

Other considerations are: _____

_____

| PART 1 SOIL FACTORS | |
|---|---|
| SCORE | OBSERVED SOIL PROPERTIES |
| surface (4 pts) / subsur. (4 pts) | surface TEXTURAL CLASS subsurface<br>☐ coarse ☐<br>☐ moderately coarse ☐<br>☐ medium ☐<br>☐ moderately fine ☐<br>☐ fine ☐ |
| (3pts) | SOIL DEPTH<br>☐ deep ( > 40")<br>☐ moderately deep (20-40")<br>☐ shallow (10-20")<br>☐ very shallow ( < 10") |
| (4 pts) | PAST EROSION<br>☐ none to slight or deposition ( < 25%)<br>☐ moderate (25-75%)<br>☐ severe ( > 75%) |
| (5 pts) | SLOPE<br>☐ nearly level (0-3%)<br>☐ gently sloping (3-6%)<br>☐ moderately sloping (6-9%)<br>☐ strongly sloping (9-16%)<br>☐ steep (16-25%)<br>☐ very steep ( > 25%) |
| (2 pts) | STONINESS<br>☐ none to slight<br>☐ moderate<br>☐ excessive |
| | INTERPRETIVE SOIL PROPERTIES |
| (4 pts) | PERMEABILITY - movement of air & water<br>☐ rapid<br>☐ moderate<br>☐ slow<br>☐ very slow |
| (4 pts) | SURFACE RUNOFF<br>☐ rapid<br>☐ moderate<br>☐ slow<br>☐ very slow or ponded |
| (4 pts) | LIMITING FACTORS<br>☐ texture ☐ stoniness<br>☐ depth ☐ permeability<br>☐ erosion ☐ runoff<br>☐ slope ☐ climate<br>☐ none |
| (6 pts) | LAND CAPABILITY<br>☐ class I ☐ class V<br>☐ class II ☐ class VI<br>☐ class III ☐ class VII<br>☐ class IV ☐ class VIII |

| PART 2 RECOMMENDED LAND TREATMENTS | |
|---|---|
| SCORE (14 pts) | VEGETATIVE TREATMENTS<br>☐ Occasional soil conserving crop in rotation<br>☐ Frequent soil conserving crop in rotation<br>☐ Return crop residue to the soil<br>☐ Practice conservation tillage<br>☐ Establish vegetation/tree wind barriers<br>☐ Establish recommended grasses and/or legumes<br>☐ Use proper pasture and range management |
| (8 pts) | MECHANICAL EROSION TREATMENTS<br>☐ Diversion terraces<br>☐ Farm on contour<br>☐ Terrace and farm on contour<br>☐ Establish grass waterway |
| (8 pts) | FERTILITY TREATMENTS<br>☐ Manure<br>☐ Nitrogen (N)<br>☐ Phosphorus ($P_2O_5$)<br>☐ Potassium ($K_2O$) |

40 pts PART 1 SCORE _____

30 pts PART 2 SCORE _____

70 pts TOTAL SCORE _____

Fig 2. Land judging score card.

capacity, and the erosion hazard level of soil. In land judging, soil textures will be determined on a sample of both surface soil and subsurface soil.

Sand, silt, and clay particles have been defined as having the following diameters: sand (2-0.05 mm); silt (0.05-0.002 mm); clay (<0.002 mm). Soil may also contain gravel (2 mm-3 inches) and stones greater than 3 inches in diameter. A field estimate of the soil texture is most easily made by moistening a soil sample, then pressing and rubbing it between the thumb and forefinger. Sand grains feel gritty and can be seen. Silt produces a floury or velvety feeling. Clay is usually sticky and plastic. When pinched between thumb and forefinger, moistened clay makes long flexible ribbons exceeding one inch in length.

Figure 4 shows the twelve soil textures recognized in the *USDA Soil Survey Manual.* These are grouped into five textural groups for land judging purposes. The sum of the percentage of sand, silt, and clay at any point in the triangle is 100.

The five texture groups used in land judging are 1. Coarse - sands and loamy sands; 2. Moderately coarse - sandy loams; 3. Medium - loam, silt loam, and silt; 4. Moderately fine - sandy clay loam, clay loam, and silty clay loam; 5. Fine - sandy clay, clay, and silty clay.

**Coarse (limiting property)**

Sands and loamy sands will not hold together. Often such soils can not retain sufficient water or plant nutrients for crop production and are subject to erosion by wind. A coarse textured soil is gritty, loose, and single grained. If dry soil is squeezed in the hand, it will fall apart when the pressure is released. If squeezed when moist, it will form a cast which will fall apart when touched. Coarse soils will not ribbon.

**Moderately Coarse (limiting property)**

This soil texture can be recognized in the field since it is predominantly sand but has enough silt and clay to make it slightly coherent; that is, it will somewhat hold a shape. Such surface soils are sandier than desirable for ordinary field crops because of low moisture holding properties. They are subject to wind erosion.

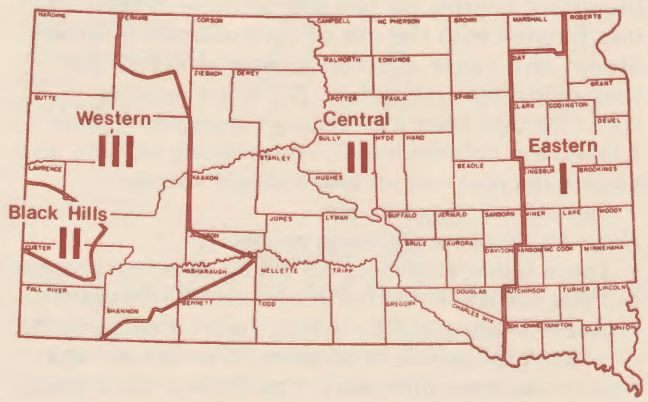



**Fig 3. Land capability class as affected by climate.**

When the soil is dry, the weak structure is easily broken. When moist soil is squeezed in the hand, it forms a cast which will withstand careful handling without breaking. Ribbons do not form readily when moist soil is pressed between the fingers.

**Medium (nonlimiting property)**

This group represents a favorable mixture of sand, silt, and clay particles, neither too fine nor too coarse. It includes silt loam, loam, and silt textured soils.

Medium textured soil may appear quite cloddy, but the clods are soft and can be easily broken. When pulverized, the silts and silt loams feel soft and floury, but the loams contain enough sand to feel somewhat gritty.

Moist medium textured soil, when pressed between thumb and fingers, forms a short ribbon up to about one-half inch in length which breaks easily if shaken. If squeezed when dry, medium soils form a cast that will withstand careful handling. If a handful is squeezed when moist, it will form a cast which can be freely handled without breaking.

**Moderately Fine (nonlimiting property)**

This texture group includes clay loam, sandy clay loam, and silty clay loam. Soils of such textures generally have stronger natural structure than those of medium textures. They are often firm and cloddy when dry and are sticky and plastic when wet.

Moderately fine textured soils easily ribbon to about an inch when squeezed between the fingers. The ribbon supports its own weight when shaken slightly. The moist soil is plastic and forms a hard cast when compressed.

Sandy clay loams feel quite gritty, silty clay loams feel smooth, and clay loams contain some grit.

**Fine (limiting property)**

The fine textured group includes sandy clay, silty clay, and clay. Soils called clays have strong structure, but, if worked wet, will become very sticky and plastic like modeling clay. They form very hard clods when dry.

Fine textured soils form a flexible ribbon more than one inch long when worked out between the fingers in a moist state. The ribbon is pliable and resists breaking even when shaken. In the sandy clay ribbon, the sand is easily visible. The silty clay and clay are particularly shiny or waxy on moist ribbons and smooth cut surfaces.

## Soil Depth Favorable for Plant Roots

The total thickness of soil material available for plant root growth is important in planning an agricultural management system. Plant roots obtain water and nutrients from the root zone. A deep root zone provides a large storehouse of nutrients and water and strong mechanical support for the plant. Most plant roots respire, requiring oxygen, so air must be available.

The roots of most plants will penetrate more than 3 feet under normal conditions if no obstruction

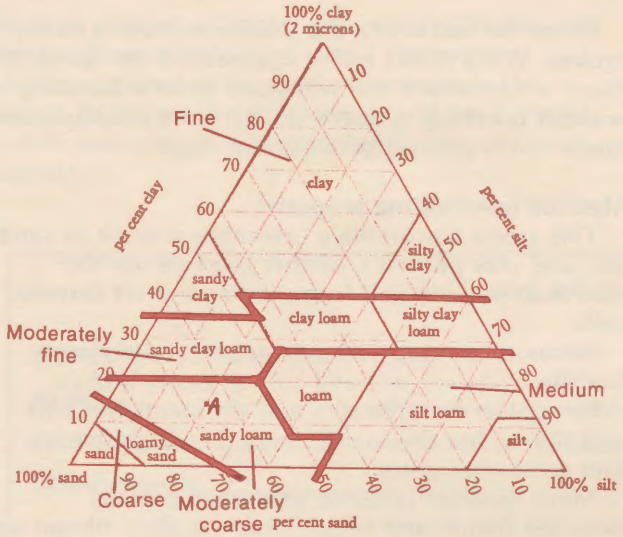



**Fig 4. Soil textures.**

exists. Soils shallower than 40 inches restrict root growth, reducing storage capacity for water and nutrients.

Examples of restrictive materials are very loose coarse sand, gravel, cobbles, clay or silt pans, sandstone, shale, bedrock, and a saturated (water table) soil zone.

Soil depth favorable for plant root growth is determined by measurement of the distance from the soil surface to the limiting layer. A depth exactly on the borderline between two categories belongs to the deeper category. (See Table 1 and Fig 5.)

The thickness of the topsoil should also be determined from the soil profile. Most normal soils have three major horizons: (1) the topsoil, or "A" horizon; (2) the subsoil, or "B" horizon; and (3) the unconsolidated parent material, or "C" horizon. There are more horizons and subdivisions used in soil classification, but we concentrate on these three in land judging.

Soil horizons vary in texture, structure, and color. Structure is often the key character separating the topsoil (A horizon) from the underlying material in South Dakota.

**Unless a restrictive layer is present, all three horizons (A, B, and C) are favorable for rooting depth.**

## Past Erosion

Erosion is the loss of soil by water and wind. Under natural conditions this is usually a very gradual process. Man, through intensive use of the land, often is responsible for the greatly accelerated soil losses that have occurred.

Many soil properties such as texture, slope, and organic matter content along with crops and tillage have an important effect on the amount of soil that has been lost.

Soil deposition may also occur either by wind or water.

**Table 1. Soil depth favorable for plant roots.**

| Category | Soil Depth, inches | Capability class |
|---|---|---|
| Deep | > 40 | I |
| Moderately Deep | 20-40 | III |
| Shallow | 10-20 | VI |
| Very Shallow | < 10 | VII |

The amount of past erosion that has occurred is calculated by comparing present topsoil depth with original topsoil depth given under "Field conditions." The categories are:

**None to slight, or deposition (nonlimiting property)**

Less than 25% of the original topsoil has been removed, or deposition has occurred.

**Moderate (limiting factor)**

From 25 to 75% of the original topsoil has been removed by erosion.

**Severe (limiting property)**

More than 75% of the original topsoil has been removed by erosion.

## Slope

Slope is the angle of inclination of the soil surface from horizontal (flat). Slope refers to the number of feet fall in each 100 feet of horizontal distance. Slope has a tremendous effect on water runoff, erosion, and the ability to use farm machinery. Even gentle slopes increase the erosion potential of a field.

The contest field slope is determined by using the slope stakes. The slope stakes are normally 100 feet apart so that each foot of elevation change equals 1%. The slope stakes may, if necessary, be placed 50 feet apart at which time each foot of elevation must be multiplied by 2 to arrive at the slope percent. If the slope stakes are set at the alternate distance of 50 feet it will be announced by the contest officials and listed under "Field conditions, other considerations."

A slope that is exactly on the borderline between two categories is considered to belong to the lesser category. See Table 2.

## Stoniness

Stoniness refers to the quantity of stones over 10 inches in diameter in or on the soil. Stones have an important bearing on soil use because of their interference with the use of agricultural machinery. Stones also cause another adverse effect in that they dilute the soil, reduce the water holding capacity, and limit the rooting volume for plants. Gravel and cobbles which limit rooting volume also greatly decrease water and nutrient storage.

Stoniness categories are:

**None to slight (nonlimiting property)**

These fields vary from no stones to a few present but not sufficient to create appreciable tillage problems. Fields will have less than 1.5 cubic yards of stones per acre foot of area. (If stones are one foot in diameter and more than 30 feet apart there are less than 1.5 cubic yards per acre foot.)

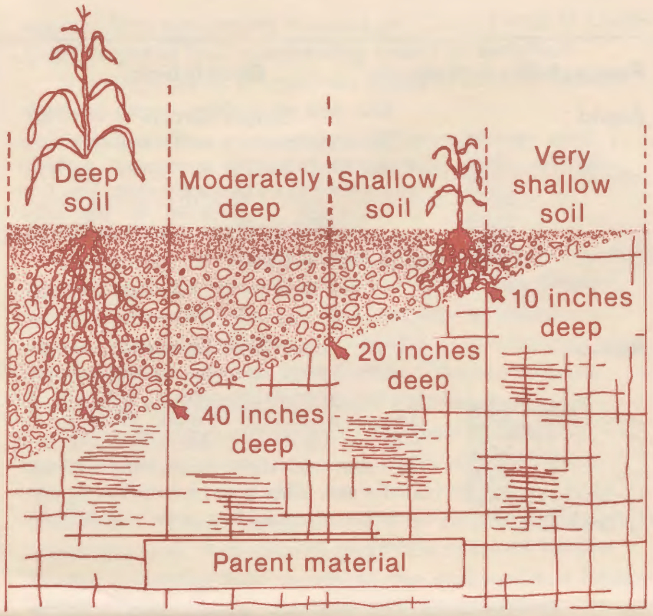



Fig 5. Depth of root zone.

**Moderate (limiting property)**

These fields have enough stones to be a nuisance during tillage operations. The stones may cause some damage to tillage equipment but do not make tillage completely impractical. Fields in this category will have from 1.5 to 50 cubic yards of stones per acre foot of area. (If stones are one foot in diameter and about 5 to 30 feet apart there are about 1.5 to 50 cubic yards per acre foot.)

**Excessive (limiting property)**

These fields have enough stones to make all use of machinery impractical. More than 3% of the surface is stones, which equals more than 50 cubic yards of stones per acre foot of area. (If stones are one foot in diameter and less than 5 feet apart there are more than 50 cubic yards per acre foot.)

Table 2. Slope categories.

| Slope | | Capability Class | |
|---|---|---|---|
| Category | Percent | Eastern | Central & Western |
| Nearly level | 0-3 | I | I |
| Gently sloping | 3-6 | II | III |
| Moderately sloping | 6-9 | III | IV |
| Strongly sloping | 9-16 | IV | VI |
| Steep | 16-25 | VI | VI |
| Very Steep | >25 | VII | VII |

## Permeability (Movement of Air and Water in the Soil)

Permeability refers to the capacity of the soil to permit air and water movement through the soil profile. Proper water-air relationships are necessary for favorable root development and normal plant growth. The subsoil or B horizon often influences water and air movement because it usually contains more clay than the surface soil.

The physical properties of texture and structure largely influence the rate of air and water movement through the soil. Soil structure refers to the arrangement of the soil particles. The individual grains may be held together in aggregates of different sizes and shapes. Soils do occur with no apparent structure; they are called "massive."

The principal types of structures are listed in Figure 7. The size, shape, and stability of these soil structural units have a major influence on productivity and offer clues to the permeability of the soil. Structure can be modified by tillage but texture cannot be changed.

The permeability categories are:

**Rapid (limiting property)**

These soils are coarse textured with single grain or granular structure. Water and air move through these soils rapidly. Such soils hold less water than is desirable, causing them to be droughty.

**Moderate (nonlimiting property)**

These soils are moderately coarse, medium, or moderately fine textured with blocky or prismatic structured subsoils.

**Slow (limiting property)**

These soils are fine to moderately fine textured with columnar or platy structured subsoils. These soils may remain wet for some period of time. Usually they are sticky and plastic when wet.

**Very slow (limiting property)**

These soils are fine textured with massive structure. Soils with claypans or heavy dense clay subsoils are also very slowly permeable. The subsoil tends to be very firm when moist. Root growth is generally restricted to along the faces of the structural units and along cracks. Soil colors are often dull and gray with flakes of orange and red.

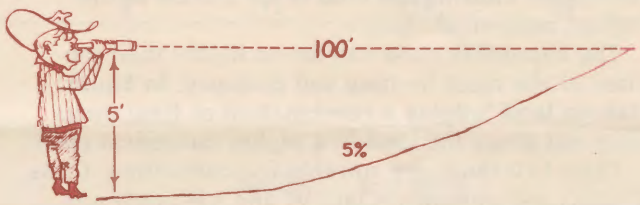



Fig 6. Shooting the slope.

## Surface Runoff

Runoff is the movement of water across the surface of the soil. It is the relative rate of water removal that is in excess of the amount that can be absorbed by soil. Runoff is affected by permeability and slope. The surface runoff categories are:

**Rapid (limiting property)**

Water is removed from the surface at a rapid rate. A large part of the water received on these fields moves rapidly over the surface. It may run off as soon as it falls. Fields with slopes above 6% (except coarse textured soils) would be in this category.

**Moderate (nonlimiting property)**

Free water stands on the surface for only short periods, usually only a matter of hours. This is desirable and normal runoff. Surplus water is not a problem on these fields. Water lost from the surface by runoff does not seriously reduce the supply available for plant growth. Gently sloping (3-6%) fields would be in this category.

**Slow (nonlimiting property)**

Free water stands on the surface of these soils for moderate periods, usually not more than a day or two. Coarse textured soils have slow runoff because of their rapid permeability. This increases the moisture supply but may occasionally interfere with farming operations. Most of the water received passes through the soil, is used by plants, or evaporates. These fields are nearly level (0-3%).

**Very slow or ponded (limiting property)**

Free water stands on the surface for long periods of time, often for several days or almost continously during wet periods. Surplus water presents a problem for most agricultural uses. Very slow runoff fields are nearly level (0-1%). Ponded fields are depressional with concave dished slopes. Ponded fields often have a permanent high water table.

## Limiting Factors

Any soil property that eliminates a field from Class I capability must be marked as a limiting factor. Consider each soil property separately and mark all which limit the land class (See Table 3). The contestant must know the climate factor for the field location (see Fig 3).

## Land Capability Class

If any limiting factor exists, the field is eliminated from land capability Class I. Often, there are more than one limiting factor. Evaluate each of the limiting factors and determine which is the most restrictive, causing the land to be placed in the highest numerical class.

The capability class can be no higher than the class of the most limiting soil property. **In South Dakota land judging a combination of limitations does not place the land in a higher numerical class.**

Class I-IV lands are suitable for cultivation. Class V lands are wetlands. Class VI and VII lands are suitable for grazing and forestry. Class VIII land is suited only for recreation and wildlife.

## Land Treatments

The land capability class determines the most intensive use the field can sustain. Through proper soil management practices, land may be used at its most intensive use without degradation for an unlimited period of time. Caution: Land can never be used more intensively than its class allows without the danger of permanently lowering its productivity and future use. Man has great influence on land through the treatments he applies.

## Vegetative Treatments

**Use an occasional soil conserving crop in rotation**

Legumes and grasses are excellent soil conserving

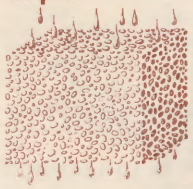
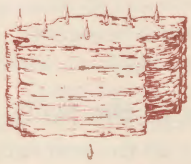
| Permeability Rating: | Descriptions |
|---|---|
| Rapid |  Single Grain<br>This represents a soil condition consisting of primarily sand sized particles which tend to remain separated. This type of condition is common in the more coarse textured soils, both surface and subsurface depths. |
| Rapid |  Crumb or Granular<br>This type of structure consists of small, porous aggregates which tend to be somewhat rounded in shape. Granular aggregates form very desirable seed beds for crops and allow rapid entry of water in the soil. This type of structure is common for many surface soils in South Dakota. |
| Moderate |  Blocky<br>This type of structure consists of aggregates clinging together in nearly square or angular blocks having sharp edges. Large blocks normally do not allow rapid entry of water in the soil. This condition is mainly found in the subsoil. |
| Moderate |  Prismatic<br>This type of structure consists of aggregates in which the vertical faces or axes are longer than the horizontal faces or axes. The tops of the units are flat. This type of structure is common under conditions of moderate permeability and associated with the subsoil. |
| Slow |  Columnar<br>This type of structure is similar to prismatic. The main difference is that the columnar units have rounded biscuit like tops. This type of structure indicates conditions of slow permeability; in fact it is an indication of a soil layer in the subsoil that is not readily penetrated by plant roots. |
| Slow |  Platy<br>This type of structure consists of aggregates that have longer horizontal faces or axes than vertical faces or axes. The fragments are flat and thin. This type of structure is usually associated with an underlying impermeable layer of the subsoil. |
| Very slow |  Massive<br>This represents a soil condition where there is no evidence of aggregation. The soil particles tend to stick together in no definite pattern or arrangement. This condition is usually found in the lower part of the subsoil and in wet spots of the surface soil. |

**Fig 7. Types of soil structure and effects on permeability.**

crops. This treatment is used on Class I and II lands.

**Use frequent soil conserving crops in rotation**

This treatment is used on Class II and IV lands.

**Return crop residue to the soil**

Crop residues contain valuable nutrients and greatly improve the soil's tilth. This treatment is used on all tillable Class I-IV lands.

**Practice conservation tillage**

Conservation tillage keeps adequate crop residues on the surface to help protect the surface from wind and water erosion. It also aids in moisture conservation by reducing surface evaporation. This treatment is used on all tillable Class I-IV lands.

**Establish vegetative/tree wind barriers**

These barriers protect coarse and moderately coarse surface textured soils from wind erosion. Vegetative barriers may be annual crops such as flax, corn, forage sorghum, etc or perennials such as wheatgrasses. Any plants that reach some height create a barrier that protects the soil surface from wind. Trees, where feasible, are an excellent permanent choice. This treatment is used on Class III and IV lands with coarse or moderately coarse surface texture.

**Establish recommended grasses and/or legumes**

Use on land not suitable for cultivation. This treatment is used on Class V, VI, and VII lands.

**Use proper pasture and range management**

Proper management of pasture and rangeland requires the control and timing of livestock grazing. Planned placement of livestock water and fences is required to establish uniform usage. This treatment is used on Class V, VI, and VII lands.

## Mechanical Erosion Treatments

**Diversion terrace**

A channel with a supporting ridge on the lower side is a diversion terrace. It is built across the slope on a gentle grade. A diversion terrace intercepts water from the slope or land above and carries the water off to a safe outlet. Use with lands where overhead water or where water flowing from adjacent land is a problem. Overhead water will be listed as an other consideration of "Field conditions."

**Farm on the contour**

Perform field operations such as tillage, planting, and cultivation on the contour or at right angles to the slope. Use on tillable lands of 3 to 6% slope.

**Establish Grass Waterway**

Establish grass waterways in drainageways where overland flowing water on tilled land is a problem. The grass waterway will protect the drainageway from erosion and from forming a gully. Overland water will be listed as an other consideration under "Field conditions."

## Fertility Treatments

**Manure**

Always apply manure to the land if available. Livestock manure aids in tilth and general soil condition even if nutrients are not required.

**Nitrogen (N), Phosphorus ($P_2O_5$), and Potassium ($K_2O$)**

Always apply any nutrient shown to be deficient by soil test. One or more of the nutrients may be required.

**Table 3. Guide to selecting land capability class in South Dakota.**

| Soil Property | Capability Class I* | II | III | IV | V | VI | VII | VIII[x] |
|---|---|---|---|---|---|---|---|---|
| Texture: surface or subsurface | medium<br>m. fine | | coarse<br>m. coarse<br>fine | | | | | |
| Soil depth | deep | | m. deep | | | shallow | v. shallow | |
| Past erosion | none | | moderate | | | severe | | |
| Slope | 0-3% | 3-6% a | 3-6% b<br>6-9% a | 6-9% b<br>9-16% a | | 9-16% b<br>16-25% | >25% | |
| Stoniness | none | | | moderate | | excessive | | |
| Permeability | moderate | slow | rapid<br>v. slow | | | | | |
| Surface runoff | moderate<br>slow | | rapid | v. slow | Ponded† | | | |
| | **Crop land** | | | | **Wetlands** | **Pasture-Hayland** | | **Wildlife** |

* Due to climatic conditions in South Dakota, Class I land is found only in the eastern part of the state; elsewhere in the state, the lands are either Class II or III.

a Eastern South Dakota conditions.

b Central and western South Dakota conditions.

† Class V; permanently ponded conditions; otherwise Class IV.

[x] Class VIII; no agricultural land; used only for wildlife and recreation.

Table 4. Land capability classes.

| | |
|---|---|
| Suited for cultivation | **Class I**—Very good land; few or no limitations; can be cultivated safely with ordinary good farming practices. There are no serious climatic hazards.<br>**Class II**—Good land; moderate limitations or hazards due to land characteristic or climatic environment; can be cultivated safely with moderately intensive treatments.<br>**Class III**—Moderately good land; severe limitations or hazards due to permanent land characteristics; can be cultivated safely with intensive treatments.<br>**Class IV**—Fairly good land; very severe limitations or hazards. |
| Land limited in use—generally is not suited for cultivation; suited for grazing, forestry or wildlife food and cover. | **Class V**—Good hay or pasture land, but too wet for cultivation. Normally bottomland soils with high water tables or subject to frequent flooding.<br>**Class VI**—Growth or utilization of vegetation moderately limited by steep land characteristics or shallow restrictive claypan; generally good to moderately good grazing lands.<br>**Class VII**—Growth or utilization of vegetation severely limited by extremely steep land characteristics, excessive stoniness, incoherent sandy soils, or very salty lowland; generally fair to poor grazing land. |
| Land not suited for cultivation, grazing, or forestry. | **Class VIII**—Suited for wildlife, recreation, or watershed protection. Consists of marshlands, badlands, and saline barren lands. |

## An Example for Land Judging Score Card Use

Use the field conditions format to record all given information for the field. Check the contestant information, making sure all information is correct. Mark the appropriate box indicating your choice(s) for each property.

**Part 1, Soil Factors**

First determine the observed soil properties such as texture, depth, erosion, slope, and stoniness. Mark the appropriate box for each property. Second, determine the interpretive soil properties.

Now that you know all factors, are there any that limit the field from qualifying as Class I land? **The most limiting factor** determines the land capability class; mark the appropriate class.

**Part 2, Recommended Land Treatment**

Land management practices are based on the land capability class determined in Part 1. Land treatments are divided into three areas—vegetative, mechanical, and fertility. It may be necessary to use treatments from all three areas. One or more vegetative treatments will always be used.

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# Land Judging in South Dakota

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